User Manual

Display

RD10

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Version	Description	Date	Written by
1.0	Created	14.02.11	C. Fessler
1.1	Revised version	24.02.11	C. Fessler
1.2	Invisible mode and AC/DC adapter clarification	28.02.11	C. Fessler
1.3	USB X5+X6 revision	30.05.11	C. Fessler
1.4	Added optional AC/DC	29.06.11	C. Fessler
1.5	Added inverted Invisible Mode	08.08.11	C. Fessler
1.6	Function keys note	18.01.12	C. Fessler
1.7	New temperature specifications	16.02.12	C. Fessler
1.8	Removed IP54 limitation	11.02.13	C. Fessler

Trademark Acknowledgments

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Conventions

This manual is divided into individual chapter with interdependent contents. If you have experience with the use of computers and/or displays, you may skip individual chapters or directly look up the respective keywords.

Pictures and tables are numbered consecutively.

Keys and key combinations are written in square brackets, e.g., [Ctrl]+[Alt]+[F1] means that you must press Control, Alt and F1 keys simultaneously.

Note

Notes contain important information in connection with the directly related text or chapter.

Attention

You will find Attention notes where data loss or display damage may be the result of non-compliance with this note.

Warning

Warnings inform you that personal damage or damage to the display or individual components thereof may be the consequence or carelessness or non-compliance with the respective warning.

Regulatory information / Disclaimers

Installation and use of this RD10 must be in strict accordance with the instructions included in the user documentation provided with the product. Any changes or modifications (including the antennas) made to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment.
The manufacturer is not responsible for any radio or television interference caused by unauthorized modification of this device, or the substitution of the connecting cables and equipment other than manufacturer specified. It is the responsibility of the user to correct any interference caused by such unauthorized modification, substitution or attachment. Manufacturer and its authorized resellers or distributors will assume no liability for any damage or violation of government regulations arising from failing to comply with these guidelines.

Note: Descriptions made in this manual are done for standard RD10. Depending on costumers configuration your device may vary.

CE

Products with the CE Marking comply with both the EMC Directive (2004/108/EC) and the Low Voltage Directive (2006/95/EC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms:

EN 55022 (CISPR 22) Radio Frequency Interference

EN 55024 (EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6,EN61000-4-8,EN61000-4-11,EN61000-3-2, EN61000-3-3) Generic Immunity Standard

LVD EN 60950 (IEC950) Product Safety, IEC 60950-1:2005

Recycling

All materials used in the construction of this unit are recyclable or environmentally friendly. Please recycle the packing materials, and at the end of the computer's life, all other materials in accordance with the local regulations.

Please refer “Material and Recycling” for the contents of the materials.

Note:

- *The equipment may still contain tiny amount of hazardous substances for health and environment, though those are below control level.*
- *To avoid spreading such substances into the eco system, and to minimize the pressure on the environment, you are encouraged to use the appropriate take-back for reusing or recycling most of the materials in a safe way after the service life.*
- *The crossed bin symbol indicates proper disposal is required.*
- *For more information on collection, reuse and recycling, please consult the local or regional waste administration for more information.*

Table of contents

1 Getting Started 14
1.1 Introduction 14
1.2 View 21
1.2.1 Front view 21
1.2.2 Rear view 22
1.2.3 Connector panel 23
1.2.4 Left/right side view 24
1.2.5 Top side view 24
1.3 Preparing the RD10 25

2 Components and Operations 27
2.1 Location 27
2.2 Ruggedness 27
2.3 Displays power supply 27
2.4 Power down 28
2.5 Interfaces 28
2.6 Keyboard 29
2.7 Touch screen 29

3 Specifications 31
3.1 Display 31
3.2 Interfaces 32
3.2.1 X1 DC-In 32
3.2.2 X2 Video in/RS232 control 32
3.2.3 X3 DVI 33
3.2.4 VGA/RGB analog 34
3.2.5 X5, X6 USB 35
3.3 Environmental rating 35
3.3.1 MIL-STD-810F 35

4 OSD Menu 37
4.1 Setup 37
4.2 Information 38
4.3 Saturation 38
4.4 OSD Position 38
4.5 Firmware 39
4.6 Gamma 39
4.7 Size 39
4.8 ADC (only VGA (RGB) analog mode) 39

4.9 Save mode 40
4.10 Sharpness 40
4.11 Contrast 40
4.12 Brightness 40
4.13 Direct Key mode 41

5 Maintenance and Service 43
5.1 Cleaning 43
5.2 Troubleshooting 43
5.3 Service 44
5.3.1 Service Supply Note: 45
5.3.2 Downloads 46

Annex 48
Annex A: List of abbreviations 48
Annex B: Table of power supply connectors for different countries 49
Annex C: List of figures 50
Annex D: List of tables 50

CHAPTER 1

Getting Started

1 Getting Started

1.1 Introduction

The multi functional 10“ XGA PIP-MFD display RD10 with a XGA Resolution of 1024 x 768 pixels allows operation under extreme environmental conditions. It was designed according to MIL-STD 810F and offers maximum protection against shock, vibration, dust and humidity. You can find detailed information in chapter 3 Specifications.

The display is equipped with a heater. Below 0°C it will heat up the display to reduce reaction time of the TFT transistors of the LCD panel. If the display reaches 50°C the temperature LED will light up. We encourage you to reduce brightness if possible. The backlight is based on LEDs. You have a wide spectrum (>1000:1) to modify the brightness.

You can also set the brightness of the keyboard. It can be changed together with backlight brightness or, in night vision mode, can be modified with the SET function.

The ON/OFF button also shuts ON/OFF devices with DP-DVI (Rocky or Panther) if connected with a DVI cable. To avoid shutting ON/OFF the display and any DP-DVI device by mistake, the ON/OFF button features a delayed circuit. The ON/OFF button must be pressed for around 5 seconds in order to shut the system ON/OFF.

The device is equipped with MIL connectors according to VG96912. Keep the protection covers closed for any unused connector.

The display unit is equipped with a sun light readable 8-wire touch screen with circular polarizer, a USB keyboard with 13 function keys (F1-F13), stereo amplifier with 2 speakers and an integrated 2port USB hub to connect additional USB hardware. The function keys F8-13 are located on the right side (vertically) of the display.

Note: All function keys (F1-F13) are programmable (ex factory). They can be reprogrammed with additional scan codes according to “Microsoft® USB Keyboard Scan Code Specification, Appendix C”.

The displays features a galvanically separated vehicle adapter and can be connected to 24V (18V-32V DV) according to VG96916 T5.

Signal inputs

The display has connectors for DP-DVI and VGA (RGB) signal sources and a composite (CVBS) video signal input. Primary signal source (DVI/VGA) will be selected automatically. Operation with two different signal sources (i.e. 2 PCs) is not intended.

Picture in picture (PIP) function

The RD10 offers a PIP function to process and display 2 video sources simultaneously. The primary display (PD) will show a DVI or VGA (RGB) signal, the secondary display (SD) will show the (composite) video signal. The secondary display will overlap the primary display partially.

Don’t use a video signal for full screen display or permanently primary display. Using computer functions would not be possible.

You can scale the secondary display up to 373x280 pixels.

There are 3 possibilities to use PIP function:

1. MODE/SET button in combination with PIP ON/OFF button
2. MODE/SET button in combination with OSD Menu
3. With the use of a RS232 connection

Position and size of video overlay via RS232

You can operate the PIP function with the help of a HyperTerminal connection.

PIP function can be configured (signal source, position, size and state) with a RS232 terminal connection. Pressing the PIP button will now activate PIP function together with the settings you made.

Communication between PIP card and application is bidirectional. Connection parameters are: **9600 baud, format 8N1**.

Configuration of PIP overlay

You can change PIP size in 4 steps (step 2-5 see below). Picture format will always be 4:3. Step 1 is default, only the primary display signal is displayed, overlay is deactivated.

Function (Step)	Display	Note	Application sends key code	PIP answers key code
0	Only computer signal (1024x768)	PIP OFF default	[F]	[f]
1	PIP-ON/OFF	= Toggle button „Usermode“	[P]	[p]
2	Field stretched 700x525	PIP display, lines doubled	[C,xpos,ypos]	[c]
3	Field reduced ½ 373x280	PIP display	[O,xpos,ypos]	[o]
4	Field reduced 1/3 243x182	PIP display	[K,xpos,ypos]	[k]
5	Field reduced ¼ 176x133	PIP display	[M,xpos,ypos]	[m]
6	Request PIP state foil keyboard	Provides state	[Q]	[(f,v,c,o,k,m) ,xpos,ypos]
7	Save settings	All settings are saved	[S]	[s]
8	Faulty characters			[y]

Table 1: PIP overlay

xpos = Position X-direction in pixel [0000…xxxx] without comma.
ypos = Position Y-direction in pixel [0000…xxxx] without comma.
Reference is the upper left corner of display.

Changing overlay position

Position of overlay can be changed pixel by pixel. The overlay will always stay inside the primary display. You can not change this behavior.

USB upstream options

USB-Upstream DVI connector (X3)	USB-Upstream VGA/RGB-Analog connector (X4)	USB-Upstream via DVI and VGA, switchable
Standard	Option	Option „dual Touch“
Internal switchable		Additional hardware necessary; not defined yet

Table 2: USB upstream

Note: There is no KVM functionality. USB Upstream is only available if you use a DVI connection together with a DP-DVI device (i.e. Rocky). If you want to use a non DP-DVI device, a customized version of RD10 with USB VGA (RGB) is available.

Invisible Mode (wire contact trigger)

Note: Invisible mode will reduce brightness of LCD and keys immediately. A wire contact will trigger invisible mode automatically.

You can set brightness for NVIS (BIV) usage and invisible mode. Press MODE/SET button and NVIS button to check NVIS settings. Invisible mode is activated with a wire contact.

Note: Invisible mode has a priority over NVIS. If invisible mode is triggered, NVIS settings are ignored even if you are in NVIS mode.

Wire contact settings (default):

1. Wire contact 18-32V, high: standard brightness or NVIS function available
2. Wire contact idle, low: invisible mode active → brightness settings for invisible mode active

During normal mode you can adjust keyboard and display brightness with the “Brightness up/down” keys. If you reach maximum brightness, the LED above the “Brightness up” key will light up.

Press Brightness up and Brightness down key simultaneously to switch Backlight off instantly.

*Note: If you use an AC/DC adapter Invisible mode via wire contact is **NOT** available.*

Inverting Invisible Mode

Invisible Mode function can be inverted. This way Invisible Mode will activate when the wire contact detects 18-32V DC and is deactivated when the wire contact is idle. To invert the Invisible Mode function, shut down the display, press “Brightness down/NVIS Button” and turn the display on. Keep pressing the “Brightness down/NVIS Button for approximately 2 seconds. Now the Invisible Mode is inverted. The undo the changes simply repeat the steps described above and press the Mode/Set button instead of the Brightness down/NVIS button.

Programming of NVIS and Invisible mode

Press MODE/SET button until the MODE/SET LED flashes orange (ca. 5 seconds). Now you can program the RD10.

1. NVIS display brightness (LED flashes orange)
   Use the Brightness up/down buttons to set display brightness during NVIS mode.

   Press MODE/SET button 1x

2. NVIS keyboard brightness (LED flashes green)
   Use the Brightness up/down buttons to set keyboard brightness during NVIS mode.

   Press MODE/SET button 1x

3. Invisible mode display brightness (LED flashes red)
   Use the Brightness up/down buttons to set display brightness during Invisible mode (triggered wire contact).

   Press MODE/SET button 1x

4. Invisible mode keyboard brightness (LED flashes red and green)
   Use the Brightness up/down buttons to set keyboard brightness during Invisible mode (triggered wire contact).

Additional Controls

Press MODE/SET 2x → Skip parameter and go to next parameter
Press MODE/SET for 5 seconds → End programming

Using NVIS button

Press MODE/SET. The LED will light up orange. Press NVIS button to activate NVIS mode. Press NVIS button or MODE/SET button to end NVIS mode.

Using BIV goggles

Set a very low display and keyboard brightness (ca 0.37 cd/m^2) if you want to use BIV goggles. Even with damped ambient light, it will be very difficult to see anything with the eyes. We encourage you to program NVIS values a night together with BIV goggles.

Note: If you want to reset NVIS and Invisible mode settings to factory values, press MODE/SET button during switching on.

Scope of delivery

Please use this list to check the package contents for completeness. Contact dealer if one or more of the following listed items are not contained in the package. Please note: most accessories are optional and not part of RD10 standard delivery.

- DC cable (optional)
- AC/DC adapter (optional)
- VGA (RGB) cable (optional)
- DVI cable (optional)
- Customized accessories (optional)
- Utility CD with stylus pen
- RD10 display (always part of delivery)

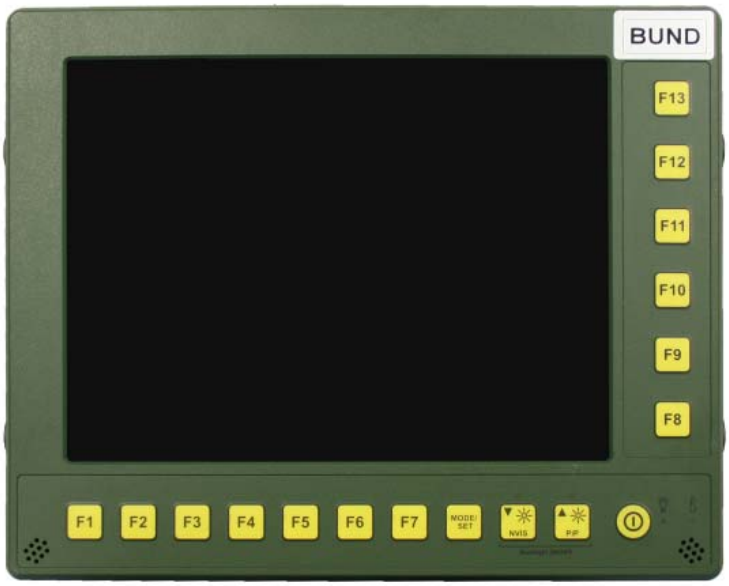


Figure 1: Display

1.2 View

Note: Some functions are optional.

1.2.1 Front view

Figure 2: Front view

Fig. 1 Keyboard Design horizontal

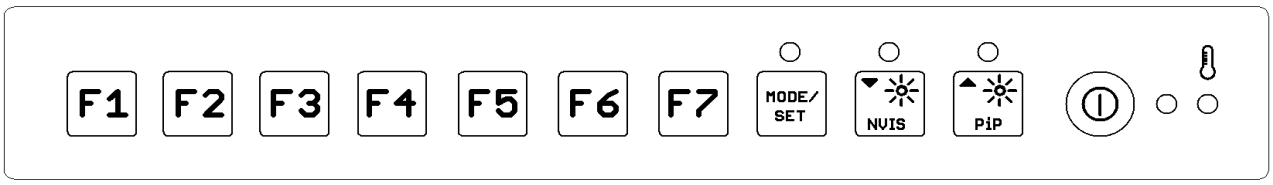


Fig. 2 Keyboard Design vertical

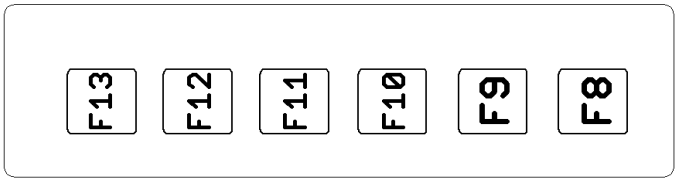


Figure 3: Foil keyboard

1.2.2 Rear view

Figure 4: Rear view

1.2.3 Connector panel

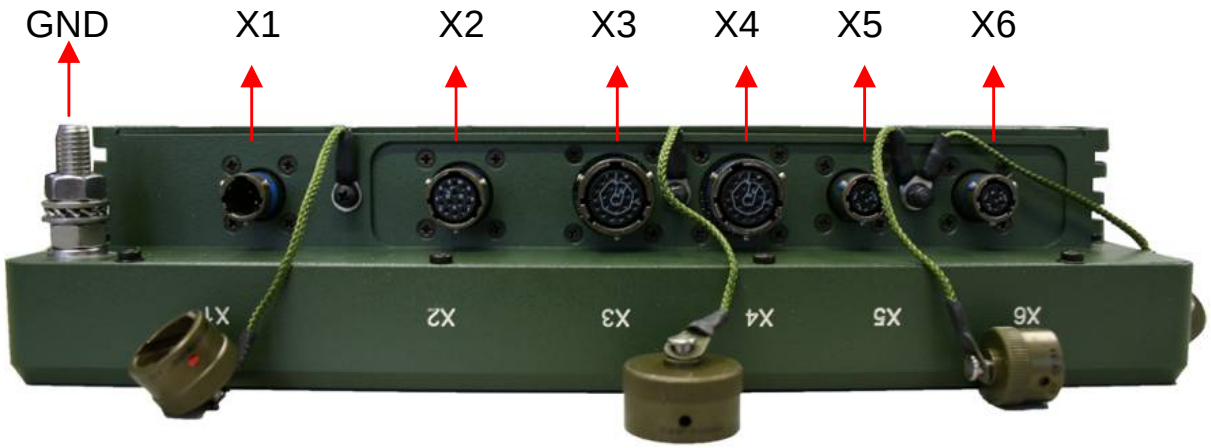


Figure 5: Connector panel

Name	Function	Connector type
X1	Power supply	SJT00RT-8-98PN014
X2	1 x Composite Video Input 1 x power supply output 12V 1 x RS232 (RX/TX) PIP-management	SJT00RT-10-35SN014
X3	DVI / Combo	SJT00GS-12-35SN014
X4	VGA/RGB-Analog / Combo (Optional)	SJT00GS-12-35SA014
X5/X6	USB Full Speed Downstream	SJT00GS-08-35SA014
GND	Earthing screw	Screw M8 (connect to service mass)

1.2.4 Left/right side view

Figure 6: View left/right

Figure 7: View left/right volume up/down

1.2.5 Top side view

Figure 8: Top side view (OSD buttons)

1.3 Preparing the RD10

- Unpack RD10. Add any mounting devices if applicable. Screws are not a part of standard delivery.
- Fasten the screws carefully. Damaging the screw threads may be a result of you put too much pressure in the screws.
- 230V AC operation: Connect the line cable with the power-supply unit and plug the plug into the electrical outlet. Plug the DC plug of the power-supply unit into the DC input of the RD10 and lock the connector well clockwise. **OR**
- 24V DC operation: Connect the DC cable with your 18-32V DC source and the display.

Note: The enclosed line cable complies with the specifications of the country in which the display was purchased. Please ensure that the line cable has been approved for the country in which the display will be used. Find further information on country-specific power plug version in the Annex.

- Connect VGA or DVI with your computer. Then connect your computer with your display using the VGA/DVI cable.
- Turn your display ON using the power button.
- If the display shows the message “No signal” activating the corresponding signal source might be necessary. Depending on your used signal source, this can be done via software or hardware settings.

The graphical output during POST can vary and depends on BIOS settings. It is possible that you need to boot up an operating system in order to use your display.

CHAPTER 2

Components and Operations

2 Components and Operations

2.1 Location

A clean and moisture-free environment is preferred. Make room for air circulation.
Avoid areas with:

- Sudden or extreme changes in temperature.
- Extreme heat.
- Strong electromagnetic fields (near television set, motor rotation area, etc.).
- Dust or high humidity.

If it is necessary to work in a hostile environment, please regularly maintain your display by cleaning dust, water, etc. to keep it in optimal condition.

2.2 Ruggedness

The display is designed with rugged features as vibration, shock, dust, and rain/water protection. However, it is still necessary to provide appropriate protection while operating in harsh environments. NEVER immerse the display completely in water. Doing so may cause permanent damages. Drop may cause parts break or permanent damages.
The I/O ports and devices must have caps tightly closed or cable inlets sealed while exposed to water or dust.
All connectors will corrode if exposed to water or moisture. Corrosion is accelerated if the power is ON. Please take proper measures in cable connection to avoid water entering into connectors. The DC jack and cables are sealed and may be operated with water splashing while attached. All port covers should be in place when no cable is attached.

2.3 Displays power supply

You can power the display via a DC cable.

2.4 Power down

To power down the display, press the power button.

2.5 Interfaces

The standard RD10 display is equipped with several interfaces:

USB

2 USB 1.1 interfaces.

Invisible mode

Next to the USB interfaces is the Invisible Mode interface. You can apply a wire to trigger Invisible mode. You can not use wire contact Invisible mode together with an AC/DC adapter.

VGA (RGB)

You can use a VGA cable to connect to any standard VGA source.

DP-DVI

You can connect any single link DVI signal source with the DP-DVI interface. Additional you can connect MilDef DP-DVI signal sources to use DVI, USB and Remote ON/OFF function.

Don’t use a dual link signal source together with a dual link DVI cable and a DP-DVI interface. This can cause malfunctions and damages. Use a single link DVI cable instead.

DC-In (power supply)

DC connecter for AC/DC adapter or DC cable.

Only use this interfaces with the devices designed to be connected to DC-In Interface.

Composite Video and RS232

You can connect your composite video signal to use the PIP function. For management purposes a RS232 interface is available.

2.6 Keyboard

Front horizontal (left to right)

1	2	3	4	5	6	7	8	9	10	11
F1	F2	F3	F4	F5	F6	F7	Mode /Set	Brightness Down Night Vision	Brightness Up PIP ON/OFF	On/Stand by delayed for 5 sec.

Front vertical (top down)

1	2	3	4	5	6
F8	F9	F10	F11	F12	F13

RD10 Top – OSD menu (left to right)

1	2	3	4
Exit Menu/Submenu	Menu navigation left / Reduce value	Menu navigation right / Increase value	Enter

Left side - Volume (top down)

1	2
Volume up	Volume down

2.7 Touch screen

Use a stylus pen to handle the touch screen. Operating the touch screen with your fingers may contaminate the touch screen und decrease the quality. In order to use the touch screen, the touch screen drivers have to be installed on the connected computer.

At ambient temperatures > 65°C pillowing is possible. This is a normal behavior and reversible as soon as the temperature is reducing. You can still operate the touch screen though.

CHAPTER 3

Specifications

3 Specifications

3.1 Display

Component	Display RD10
Size	10”
Resolution (max.)	XGA 1024 x 768 Pixel
Luminance	typ. 280 cd/m^2
Contrast	400:1
Reaction time	25ms ton/toff
Angle of view	Horizontal 160° Vertical 80°/40°
Displayable Colors	16.7 Mio.
Interfaces	DC-In, VGA, DP-DVI, 2x USB 1.1, Invisible Mode
H-Frequency	60 Hz
V-Frequency	60 Hz
Power supply	18-32V DC, Nominal 24V DC Max 50W (with Heater active)
Operating temperature	-32° to + 55°C
Storage temperature	-46° to + 70°C
IP	IP65
Color	Nato green (RAL6031HR)
Dimensions (WxHxD)	293 x 235 x 62 mm
Weight	Ca. 3 kg
Environment	MIL-STD 810F
EMI	MIL-STD 461E

Table 3: Components display

3.2 Interfaces

3.2.1 X1 DC-In

Connector: SJT00RT-8-98PN014

Pin assignment:

Signal	Description	Pin
24V DC	Power supply 24V (18-32V)	1/A
GND	GND	2/B
Invisible mode	Invisible mode wire contact	3/C

Table 4: X1 interface

Note: 24V nominal voltage

3.2.2 X2 Video in/RS232 control

Connector: SJT00RT-10-35SN014

Pin assignment:

Signal	Description	Note	Pin
Video Composite	Y1	Input	1
Video GND	Y1 Ground	Reference	2
Power GND	12V return	Reference	3
12V/500mA	Camera[1]	Output	4
Heater off	Camera[2]	Output	5
Factory	Camera[3]	n/c	6
Factory	Camera[3]	n/c	7
n/c			8
n/c			9
n/c			10
RxD	RS232	Input	11
TxD	RS232	Output	12
GND	RS232	Reference	13

Table 5: X2 interface

1: only with PIP active
2: only with PIP and NVIS active
3: reserved

3.2.3 X3 DVI

Connector: SJT00GS-12-35SN014

Pin assignment:

Signal	Signal type	Pin
TDMS TX2 N	Input	1
TDMS TX2 P	Input	2
TDMS 2 GND	Reference	3
PWRSW (Syspwr. Switch)	Output	4
DDC Clock Digital (SCL)	I/O	5
DDC Data Digital (SDA)	I/O	6
TDMS TX1 N	Input	7
TDMS TX1 P	Input	8
TDMS 1 GND	Reference	9
Speaker Left	Input	10
Speaker Right	Input	11
DVI +5V/50mA	Input	12
GND	Reference	13
Hot Plug Detect (HTPLG)	Output	14
TDMS TX0 N	Input	15
TDMS TX0 P	Input	16
TDMS 0 GND	Reference	17
USB N upstream (TX)	I/O	18
USB P upstream (TX)	I/O	19
GND	Reference	20
TDMS CLK P	Input	21
TDMS CLK N	Input	22

Table 6: X3 interface

3.2.4 VGA/RGB analog

Connector: SJT00GS-12-35SA014

Pin assignment:

Signal	Signal type	Pin
Red	Input	1
Red GND	Reference	2
Green	Input	3
Green GND	Reference	4
Blue	Input	5
Blue GND	Reference	6
Reserved		7
H-Sync	Input	8
Sync GND	Reference	9
V-Sync	Input	10
Sync GND	Reference	11
Reserved		12
DDC Clock analog (SCL)	I/O	13
DDC GND	Reference	14
DDC Data analog (SDA)	I/O	15
Reserved		16
USB N upstream (TX) (option)	I/O	17
USB P upstream (TX) (option)	I/O	18
GND	Reference	19
Speaker left		20
Speaker right		21
reserved		22

Table 7: X4 interface

3.2.5 X5, X6 USB

Connector: SJT00GS-08-35SA014

Pin assignment:

Signal	Description	Pin
n/c	n/c	1
USB VCC	+5V	2
USB N	USB Data-	3
USB P	USB Data+	4
n/c	n/c	5
GND	Ground	6

Table 8: X5, X6 interface

3.3 Environmental rating

3.3.1 MIL-STD-810F

Item	Criteria
Temperature	According to MIL-STD-810F, Method 501.4 and 502.4 Procedure I, II
Vibration	According to MIL-STD-810F, Method 514.5 Category 20, Procedure 1, Figure 514.5C-3
Shock	According to MIL-STD-810F, Method 516.5 Procedure I • 15g, 3ms 100 shocks vertical half sine • 100g, 0.5ms 2 shocks per axis, half sine • 25g, 6ms 3 shocks per axis, half sine

Table 9: MIL-STD-810F

CHAPTER 4

OSD Menu

4 OSD Menu

Note: Pressing Enter button and up button simultaneously will reset OSD settings to factory values. PIP settings will be reset as well. You must reprogram them with the RS232 function.

Press any OSD menu button to enter OSD main menu. You can navigate with the up down buttons. Select sub menu with enter. You can exit sub menus and main menu with the escape button.

Note: If there are no inputs for 20 seconds, OSD menu will exit itself automatically.

To save changed values you must execute the “Save mode” function.

Main menu and sub menus functions:

Navigate → Up/down buttons
Select → Enter button
Exit → Escape button

Adjust or toggles values with the up/down buttons.

4.1 Setup

Function	Description
PD_SOURCE	Select PD source: VGA (RGB), DVI
PD_OUTPUT	Select PD output format: All timings of timing table → VGA_60, SVGA_60,...

Table 10: OSD setup

4.2 Information

No input possible.

Function	Description
Display	Single / dual Format, i.e. RGB Display type, i.e. DIS-2
PD	Source, i.e. Video_1 Input timing Output window
SD	Source, i.e. Video_1 Input timing Size

Table 11: OSD information

4.3 Saturation

Function	Description	Default
SATURATION	Set saturation Values: 0 – 255 Value 0 = black/white	64

Table 12: OSD saturation

4.4 OSD Position

Function	Description
OSD H POS	Change horizontal OSD position
OSD V POS	Change vertical OSD position
OSD AUTO	Center OSD
ALPHA	Alpha-value of OSD Non transparent: 31 Transparent: 0

Table 13: OSD position

4.5 Firmware

No input possible.

Function	Description
	Not used

Table 14: OSD firmware

4.6 Gamma

Function	Description	Default
GAMMA	Set Gamma values. Values: off, 1 to 7	off

Table 15: OSD Gamma

4.7 Size

Function	Description
PD_H_SIZE	Change horizontal size PD
PD_V_SIZE	Change vertical size PD
PD_H_POS	Change horizontal position PD
PD_V_POS	Change vertical position PD
PD_H_CAP	Change horizontal capture value PD
PD_V_CAP	Change vertical capture value PD

Table 16: OSD size

4.8 ADC (only VGA (RGB) analog mode)

Function	Description
PHASE	Set phase, values: 0 – 31
CLOCK	Set AD transformer sampling rate Values: sampling rate +/- 120

Table 17: OSD ADC

4.9 Save mode

Function	Description
SAVE MODE	Save changes.

Table 18: OSD save mode

4.10 Sharpness

Function	Description	Default
SHARPNESS	Sharpness ON/OFF	off

Table 19: sharpness

4.11 Contrast

Function	Description	Default
CONTRAST	Set contrast. Values: 0 – 255.	62

Table 20: OSD contrast

4.12 Brightness

Function	Description	Default
BRIGHTNESS	Set digital brightness (no backlight!) Values: 0 – 255.	130

Table 21: OSD brightness

4.13 Direct Key mode

Press MODE/SET button to activate Direct Key mode. Functions of OSD keys are changes to:

Key	Description
ESC	Decrease brightness (keep button pushed)
ENTER	PIP function ON/OFF
DOWN	Increase digital brightness (no backlight)
UP	Decrease digital brightness (no backlight)

Table 22: Direct key mode

CHAPTER 5

Maintenance and Service

5 Maintenance and Service

5.1 Cleaning

ALWAYS turn OFF the power, unplug the power cord and remove the battery before cleaning. The exterior of the system and display may be wiped with a clean, soft, and lint-free cloth. If there is difficulty removing dirt, apply non-ammonia, non-alcohol based glass cleaner to the cloth and wipe. An air gun is recommended for cleaning water and dust. For salty water please clean with fresh water then blow-dry with an air gun. Be sure not to turn the display up side down while there is water being applied.

5.2 Troubleshooting

Should the display fail to function properly, the troubleshooting steps below may be followed.

- Check AC/vehicle adapter, battery, and the power source.
- Minimize the configuration, i.e., remove extra peripherals and devices.
- Check OSD settings (i.e. brightness settings)
- Remove the software suspected.
- Set BIOS fail-safe default.
- Re-install operating system and application software.

5.3 Service

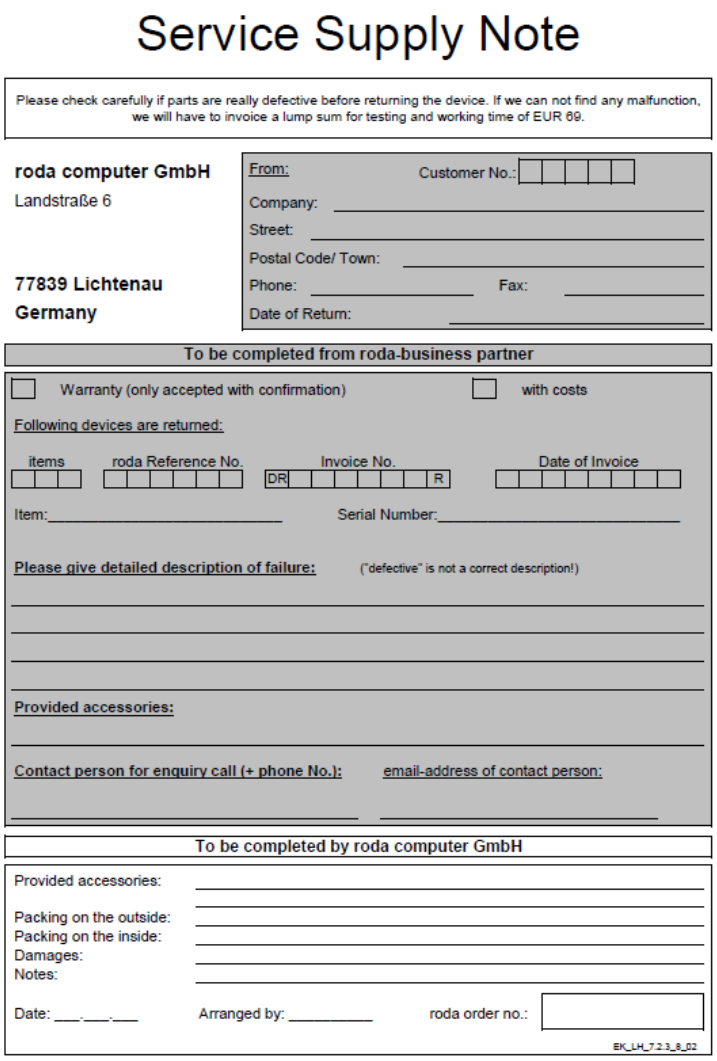
If troubleshooting steps are unsuccessful, consult your dealer for service.
If they can not help you please call roda Service Center.

Service address: roda computer Center Bredenhop 20 32609 Hüllhorst Phone.: +49 5744-944 470 Fax: +49 5744-944 475 E-Mai: support@roda-computer.com	Service: Mon – Thu 8:30 am - 12:30 pm & 1:00 pm - 4:30 pm Fri 8:30 am - 12:30 pm & 1:00 pm - 3:00 pm

Note: The roda Service Center needs a detailed description of the problem and the serial number of the device.

If it is necessary to send in your computer for repairs, you can download a service waybill (Service Supply Note) on the roda homepage (www.roda-computer.com), which you have to fill in.

5.3.1 Service Supply Note:



Service Supply Note

Please check carefully if parts are really defective before returning the device. If we can not find any malfunction, we will have to invoice a lump sum for testing and working time of EUR 69.

roda computer GmbH
Landstraße 6

77839 Lichtenau
Germany

From: Customer No.:
Company:
Street:
Postal Code/ Town:
Phone: Fax:
Date of Return:

To be completed from roda-business partner

Warranty (only accepted with confirmation) with costs

Following devices are returned:

items | roda Reference No. | Invoice No. DR R | Date of Invoice

Item: Serial Number:

Please give detailed description of failure: ("defective" is not a correct description!)

Provided accessories:

Contact person for enquiry call (+ phone No.): email-address of contact person:

To be completed by roda computer GmbH

Provided accessories:
Packing on the outside:
Packing on the inside:
Damages:
Notes:

Date: ___.___.___ Arranged by: _____ roda order no.:

EK_LH_7.2.3_8_02

Figure 9: Service Supply Note

Include this sheet with the following information:

- Name
- Address
- Serial number, Customer number, Article number
- Place and date of purchase or the original invoice number
- Date of failure
- A DETAILED description of the problems you have encountered
- A list of the hardware/ software configuration, if applicable

5.3.2 Downloads

Check our website (www.roda-computer.com) for downloads:

- Updates
- Drivers
- Manuals
- Service Supply Note

Annex

A N N E X

Annex

Annex A: List of abbreviations

A	Ampere (unit)
AC	Alternating Current
ADC	Analog to Digital Converter
BIOS	Basic Input Output System
C	Celsius (unit)
CD	Compact Disk
cd	Candela (unit)
CE	Conformité Européene
CRT	Cathode Ray Tube
CVBS	Colour Video Blanking Signal
DC	Direct Current
D-sub	D-subminature (Sub-D)
DVI	Digital Visual Interface
EMV	Elektro-Magnetische Verträglichkeit
EN	Europäische Norm
F	Fahrenheit (unit)
FCC	Federal Communication Commision
GHz	Giga-Hertz (unit)
GND	Ground
Hz	Hertz
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
I/O	Input/Output
IP	Ingress Protection
kHz	Kilo-Hertz (unit)
LCD	Liquid Crystal Display
LED	Light Emitting Diode
mAh	Milliampere Hour (unit)
MHz	Mega-Hertz (unit)
NVIS	Night Vision
OSD	On Screen Display
PC	Personal Computer
PIP	Picture in Picture
POST	Power On Self Test
RD	Ruggedised Display
RGB	Red Green Blue (Video signal)
TÜV	Technischer Überwachungs Verein

UL	Underwriters Laboratories
USB	Universal Serial Bus
V	Volt (unit)
VGA	Video Graphics Adapter
W	Watt (unit)

Annex B: Table of power supply connectors for different countries

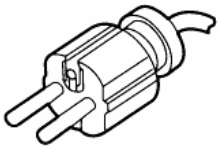
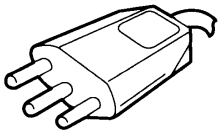
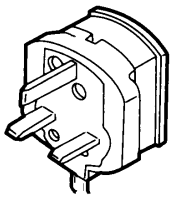
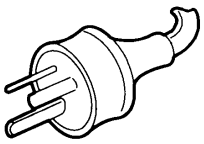
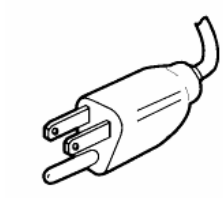
Version	Country/region	Technical data
	Europe	230V, 50Hz, 6A
	Switzerland	220V, 50Hz, 6A
	Great Britain	240V, 50Hz, 6A
	Australia	240V, 50Hz, 6A
	North America	120V, 60Hz, 7A

Table 23: Table of power supply connectors

Annex C: List of figures

FIGURE 1: DISPLAY 20
FIGURE 2: FRONT VIEW 21
FIGURE 3: FOIL KEYBOARD 21
FIGURE 4: REAR VIEW 22
FIGURE 5: CONNECTOR PANEL 23
FIGURE 6: VIEW LEFT/RIGHT 24
FIGURE 7: VIEW LEFT/RIGHT VOLUME UP/DOWN 24
FIGURE 8: TOP SIDE VIEW (OSD BUTTONS) 24
FIGURE 10: SERVICE SUPPLY NOTE 45

Annex D: List of tables

TABLE 1: PIP OVERLAY 16
TABLE 2: USB UPSTREAM 16
TABLE 3: COMPONENTS DISPLAY 31
TABLE 5: X1 INTERFACE 32
TABLE 6: X2 INTERFACE 32
TABLE 7: X3 INTERFACE 33
TABLE 8: X4 INTERFACE 34
TABLE 9: X5, X6 INTERFACE 35
TABLE 10: MIL-STD-810F 35
TABLE 11: OSD SETUP 37
TABLE 12: OSD INFORMATION 38
TABLE 13: OSD SATURATION 38
TABLE 14: OSD POSITION 38
TABLE 15: OSD FIRMWARE 39
TABLE 16: OSD GAMMA 39
TABLE 17: OSD SIZE 39
TABLE 18: OSD ADC 39
TABLE 19: OSD SAVE MODE 40
TABLE 20: SHARPNESS 40
TABLE 21: OSD CONTRAST 40
TABLE 22: OSD BRIGHTNESS 40
TABLE 23: DIRECT KEY MODE 41
TABLE 24: TABLE OF POWER SUPPLY CONNECTORS 49